



EARTH SCIENCES 206

PRINCIPLES OF OCEANOGRAPHY

School of Earth Sciences

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Course Description

“Principles of Oceanography” is an introduction to the fundamental concepts of Oceanography for early science and non-science majors. The course will provide an overview of the historical, physical, chemical, geological, and biological aspects of the oceans, as well their importance to the Earth System. It contains 13 lessons grouped in 9 modules. Module I introduces the science of Oceanography and the importance of studying the oceans. It discusses the role of the ocean in the Earth System and the origins of Earth’s ocean. It also provides a description of our planet’s oceans and major seas. Module II deals with the history of oceanography from the early Polynesian navigators to the current status of the science of oceanography. Module III introduces the geology of the sea-floor with two lessons looking at marine provinces and marine sediments. Module IV discusses the physical and chemical properties of water and seawater. Module V will discuss some of the most important interactions between the ocean and the atmosphere. Module VI will have three lessons dealing with major physical processes in the ocean, including the formation and development of ocean currents, waves and tides. Module VII covers coastal oceanography and the processes happening at the boundary between land and ocean. Module VIII deals with the distribution of life in the oceans, as well as biological productivity and energy transfer in the marine environment. The last module (Module IX: Uses and abuses of the ocean) is tentative and will be offered if time allows.

Learning Objectives

This course will provide students with a basic introduction to the principles and methods of oceanography. Students will learn about the descriptive geography of the oceans as well as about some of the key historical events that contributed to the development of oceanography as a science and led to our present state of understanding of the world's oceans. Students will recognize the different areas of the study of the oceans (geological, chemical, physical and biological oceanography) and their respective techniques. They will also learn about coastal oceanography, the processes acting at the boundary between land and ocean, and the results of the interaction between the ocean and the atmosphere. Students will review major oceanographic process and their impacts on the planet, as well as the environmental and economic importance of the ocean in our lives.

This course fulfills the learning objectives of the GEC Natural Science requirement. It also provides a laboratory experience for students. Laboratory activities will offer students the opportunity to apply their content understandings to solve hands-on oceanographic problems.

Assigned readings from the required textbook (Trujillo and Thurman, Essentials of Oceanography, 9th edition, 2008, ISBN 0132401223, Pearson - Prentice Hall) will support the lectures and give students the opportunity to formulate questions about the topic before it is discussed in class, allowing for a richer, livelier learning environment. The book comes with a resources CD containing animations and images that help the visualization of key oceanographic processes. Other recommended texts are listed below.

Other Recommended Texts

An Introduction to the World's Oceans, by Keith Sverdrup, Alison Duxbury, and Alyn Duxbury, 8th Ed. (2005), McGraw Hill, 514 pp., ISBN 0072528079

Introduction to Ocean Sciences, by Douglas Segar, 2nd Ed. (2007), W.W. Norton & Co., 581 pp., ISBN 039392629X

Ocean Circulation & Climate, by Gerold Siedler, John Church, and John Gould, International Geophysics Series, Volume 77 (2001), Academic Press, 715 pp., ISBN 0126413517

Disability Statement

Any student who feels s/he may need an accommodation based on the impact of a disability should contact Michelle McLane at the Office of Disability Services to discuss her or his specific needs. You can contact Michelle by calling 419-755-4304 or visit her at C-100E Conard Learning Center in order to coordinate reasonable accommodations. Alternatively you can contact me privately to discuss your needs.

Course Assignments and Grading Scheme

The following are the course assignments and their contribution to your final grade:

1. Weekly lab reports (theoretical and practical exercises) = 30% of final grade
2. Two quizzes = 15% (each) of the final grade
3. Final exam = 40% of final grade

The course final grade will be determined by the following equation:

$$(L*30) + (Q_1*15) + (Q_2*15) + (F*40) / 100$$

Where, **L** is the average grade of all lab reports (30% of the final grade),
Q is the grade from your quizzes (each 15% of the final grade),
F is the grade from your final exam (40% of the final grade).

The following grading scheme will be used to submit grades to the Registrar through Carmen.

| | | |
|-------------|---|----|
| 93 or above | ⇒ | A |
| 90 – 92 | ⇒ | A- |
| 87 – 89 | ⇒ | B+ |
| 83 – 86 | ⇒ | B |
| 80 – 82 | ⇒ | B- |
| 77 – 79 | ⇒ | C+ |
| 73 – 76 | ⇒ | C |
| 70 – 72 | ⇒ | C- |
| 67 – 69 | ⇒ | D+ |
| 60 – 66 | ⇒ | D |
| 0 – 59 | ⇒ | E |

All lab reports, quizzes and final exam will be graded from 0 to 100 and the grade will be multiplied by the respective factor weight.

Course assignments and quizzes, as well as the PowerPoint lectures and the lab tutorials, will be available to students through Carmen, the OSU course management system (please contact me ASAP if you are not familiar with Carmen).

Lab reports are due on the day of your assigned lab date.

There will be NO make-up quizzes or exams unless in exceptional circumstances and ONLY if discussed with the instructor in advance of the date of the quiz.

PowerPoint lectures will be available for download one day (24 hours) before the class is held. Students are welcome to print a handout of the PowerPoint slides and bring it to class to help them in note-taking.

Statement on Academic Misconduct

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's Code of Student Conduct (http://studentaffairs.osu.edu/resource_csc.asp), and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's Code of Student Conduct and this syllabus may constitute "Academic Misconduct."

The Ohio State University's Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University, or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's Code of Student Conduct is never considered an "excuse" for academic misconduct, so I recommend that you review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me. You can also talk to Donna Hight at the Office of Student Affairs (Tel: 419-755-4034; E-mail: hight.6@osu.edu) or check the following sources of information:

The Committee on Academic Misconduct web page:
(<http://oaa.osu.edu/coam/home.html>)

Ten Suggestions for Preserving Academic Integrity:
(<http://oaa.osu.edu/coam/ten-suggestions.html>)

Eight Cardinal Rules of Academic Integrity:
(<http://www.northwestern.edu/uacc/8cards.html>)

The Writing Center

The Writing Center (writingcenter@osu.edu) provides free individual writing consultation for students of all writing abilities and in any course or field of study. The Writing Center assists students in the production of writing assignments and in the development of best writing practices. You are welcome to use Writing Center services on a walk-in basis, or by appointment at 230 Ovalwood Hall and at the Conard Learning Center.

Course Structure (Outline)

Module I: Introduction to Oceanography

Lesson 1: *Introduction to Oceanography*

Module II: History of Oceanography

Lesson 2: *History of Oceanography*

Module III: Geological Oceanography

Lesson 3: *Marine Provinces*

Lesson 4: *Marine Sediments*

Module IV: Chemical Oceanography

Lesson 5: *Physical and Chemical Properties of Water and Seawater*

Module V: Ocean-Atmosphere Interactions

Lesson 6: *Ocean-Atmosphere Interactions*

Module VI: Physical Oceanography

Lesson 7: *Surface Ocean Circulation*

Lesson 8: *Deep Ocean Circulation*

Lesson 9: *Waves and Tides*

Module VII: Coastal Oceanography

Lesson 10: *Coastal Oceanography*

Module VIII: Biological oceanography

Lesson 11: *Life in the Ocean*

Lesson 12: *Marine Productivity and Energy Transfer*

Module IX: Uses and Abuses of the Ocean

Lesson 13: *Uses and Abuses of the Ocean*